Bare Bones Basics:
Homology Outreach for Children Using Dinosaur Bones

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INTRODUCTION

Dinosaurs are frequently used as ambassadors of science for children and adults, garnering major attention at museums and within popular culture. Oklahoma State University Center for Health Sciences student doctors participated in a dinosaur fossil excavation as part of a faculty mentor-student mentee fellowship utilizing the association of dinosaurs and science learning to provide research experience as well as opportunities to practice the role of science communicators through elementary school education and outreach. Demonstrating the concept of **skeletal homology,** that the bones in the human skeleton share a common ancestral origin with the bones of all other vertebrates-including dinosaurs- is one way to introduce young students to the field of medicine.

BACKGROUND

Over several weeks in Montana, CHS student doctors assisted faculty with data collection by applying comparative anatomy to identify and excavate limb bone fossils of the dinosaur Maiasaura. They were then tasked with developing a bone homology outreach activity, using paleontology to demonstrate homologous structures across species in order to generate excitement in children for STEM fields.

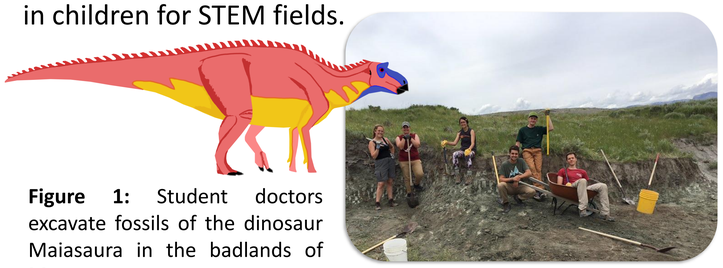

Figure 1: Student doctors excavate fossils of the dinosaur Maiasaura in the badlands of Montana.

STUDENT INTRODUCTION

Partnering with Eugene Field Elementary, a Title 1 Partner in Education with OSU-CHS, the concept of homology was demonstrated the to a 4th grade class. To begin, a brief overview of upper extremity anatomy was given. Skeletal drawings of animal forelimbs were presented alongside an articulated human skeleton to demonstrate the three bones in the upper extremity (humerus, radius, and ulna). Students were also shown how to palpate these bones on themselves in order to further solidify understanding before proceeding.

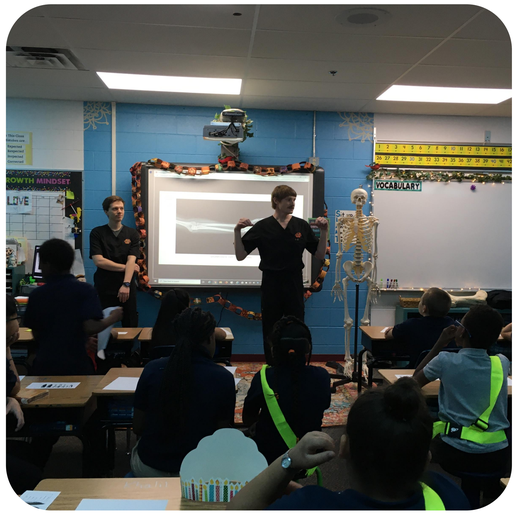

Figure 2: Student doctor Casey Love visually demonstrating arm bone anatomy with the help of “Skinny” the articulated skeleton

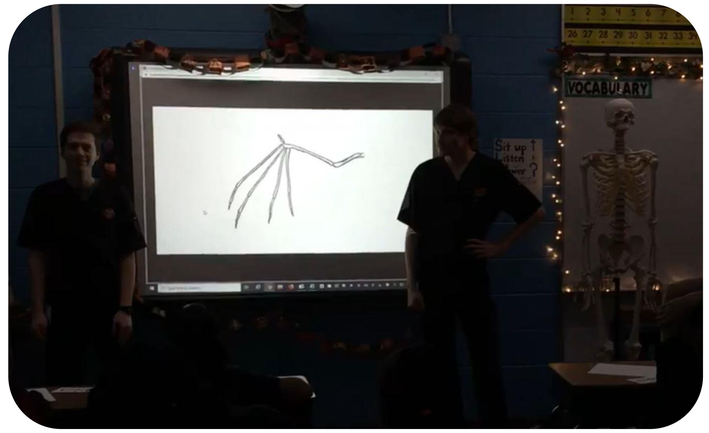

Figure 3: Visual assistance using the projector was useful in demonstrating morphology is various species

INTERCTIVE PRESENTATION

Next, the children examined humeri from armadillo, field mouse, turtle, deer, rhinoceros, and Maiasaura. By using these models, comparative anatomy, and a few hints, the students worked out which animal each humerus originated from. This concept was further explored with discussion about how morphology is conserved between species but can be adapted depending upon the needs of the animal.

Figure 4: A 4-th grader whispers their best guess to student doctor William Estep on what animal this humerus belongs to.

The class was instructed to color the homologous bones of the forelimb of species after a quick lesson of the three major bones in the arm.

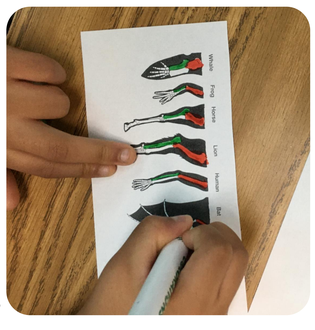

Figure 5: A student colors the homologous bones in the various species

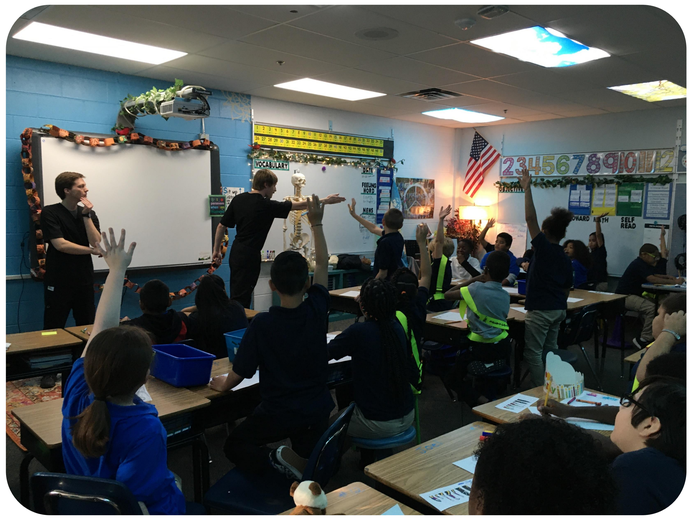

Figure 6: Students eagerly wait for their questions to be answered regarding homology

CONCLUSIONS

Using animal models, and especially dinosaurs as teaching tools, effectively demonstrated and solidified the scientific concept of homology, and satisfied Oklahoma 4th grade science standard 4-LS1-1. Combining paleontology with an interactive approach could be extrapolated and further applied to other scientific concepts and be an effective teaching tools for elementary students.

ACKNOWLEDGEMENTS

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